

REMARKS

Claims 1-39 are currently pending in this application. In the Office Action, dated February 17, 2009 the Examiner objected to the specification for informalities; rejected claims 3 and 15 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite; rejected claims 1-26, 35, and 39 under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent No. 5,556,708 to Hörl et al. ("*Hörl*") in view of U.S. Patent No. 5,037,656 to Pitt et al. ("*Pitt*"); rejected claims 27-30, 32, and 36 under 35 U.S.C. § 103(a) as allegedly being obvious over *Hörl* in view of *Pitt* and further in view of U.S. Patent No. 6,774,102 to Bell et al. ("*Bell*"); rejected claim 31 under 35 U.S.C. § 103(a) as allegedly being obvious over *Hörl*, in view of *Pitt*, in view of *Bell*, and further in view of U.S. Patent No. 4,668,399 to Duggins ("*Duggins*"); and rejected claims 33, 34, 37, and 38 under 35 U.S.C. § 103(a) as allegedly being obvious over *Hörl*, in view of *Pitt*, in view of *Bell*, and further in view of U.S. Patent No. 4,618,533 to Steuck ("*Steuck*").

By this Reply, Applicant has amended the specification and claims 3, 11, 16, and 24 to correct minor informalities. Thus, no new matter has been added.

Objection to Specification

The Examiner objected to the specification for not disclosing section headings. See Office Action at p. 2. Applicant has amended the specification to provide the section headings and respectfully requests that the Examiner withdraw this objection.

Section 112 Rejection

Claims 3 and 15 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for reciting an improper Markush group language. See Office

Action at p. 2. For purposes of this Reply, Applicant has assumed that the Examiner was referring to claim 16 and not claim 15, since claim 15 does not recite the allegedly objectionable phrase "selected from the group of." Applicant has amended claims 3 and 16 to recite "selected from a group consisting of" as suggested by the Examiner. Accordingly, Applicant respectfully requests that the Examiner withdraw the §112 rejection.

Section 103 Rejections

The Examiner has issued the following rejections under 35 U.S.C. § 103(a):

- Claims 1-26, 35, and 39 were rejected as allegedly obvious over *Hörl* in view of *Pitt*;
- Claims 27-30, 32, and 36 were rejected as allegedly obvious over *Hörl* in view of *Pitt* and further in view of *Bell*;
- Claim 31 was rejected as allegedly obvious over *Hörl* in view of *Pitt* and *Bell*, and further in view of *Duggins*; and
- Claims 33, 34, 37, and 38 were rejected as allegedly obvious over *Hörl* in view of *Pitt* and *Bell*, and further in view of *Steuck*.

See Office Action at pp. 4-9. Applicant respectfully traverses each of these rejections.

The Examiner must make several basic factual inquiries to determine whether the claims of a patent application are obvious under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere*, require the Examiner to:

- (1) Determine the scope and content of the prior art;
- (2) Ascertain the differences between the prior art and the claims in issue;
- (3) Resolve the level of ordinary skill in the pertinent art; and
- (4) Evaluate evidence of secondary considerations.

See *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). The obviousness or non-obviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Id.*; see also *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1734 (2007). Specifically, once the findings of fact are articulated, the Examiner "must then make a determination whether the claimed invention 'as a whole' would have been obvious at the time to that person." *Id.* "To reach a proper determination under 35 U.S.C. § 103, the Examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made." M.P.E.P. § 2142, 8th Ed., July 2008 Rev.

Based on the Supreme Court's decision in *KSR*, the Patent Office has announced seven exemplary rationales that may support a conclusion of obviousness. See M.P.E.P. § 2143. All of these bases for obviousness require that one of ordinary skill in the art, without knowing anything of the claimed invention, would not only be motivated to produce that invention, but also would have a reasonable expectation of success and achieve predictable results. Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness for claims 1-39 because one skilled in the art would not have predicted the instantly claimed invention based on the cited references.

§ 103(a) Rejection of Claims 1-26, 35, and 39

All of the obviousness rejections issued by the Examiner rely on the combination of *Hörl* in view of *Pitt*. The Examiner acknowledges that *Hörl* "does not disclose the use of a thermally labile radical initiator to promote the polymer grafting process," but contends that *Pitt* cures these deficiencies in *Hörl* because *Pitt* allegedly discloses "an

azo compound such as 4,4'-azobis-(4-cyanovaleric acid) as a thermally labile radical initiator to promote graft polymerization" Office Action at pp. 4-5. Applicant respectfully disagrees and submits that one skilled in the art would not have combined the non-analogous teachings of *Hörl* and *Pitt* to arrive at the instantly claimed invention.

Hörl describes a method for grafting ethylenically unsaturated monomers to nitrogen-containing polymers. See, e.g., *Hörl* at col. 1, ll. 8-12. According to column 4, lines 40-52 of *Hörl*, the authors cannot explain the mechanism on which the method is based, but have determined that the method absolutely requires the use of reducing agents. Indeed, *Hörl* teaches that "[i]n the absence of the reducing agent, no grafting at all takes place" *Hörl* at col. 4, ll. 47-48. In contrast, *Pitt* teaches a method for producing a composite porous membrane that applies the formation of radicals to initiate the polymerization reaction. See, e.g., *Pitt* at Abstract and col. 4, ll. 29-36. However, since radicals are oxidizing agents, they have the opposite effect of the reducing agents required by *Hörl*. Thus, the invention of *Hörl* would not function for its intended purpose if the reducing agents disclosed therein were replaced with the thermally labile radical initiators disclosed in *Pitt*. Accordingly, one skilled in the art would not have been motivated to combine the non-analogous teachings of *Hörl* with those of *Pitt* to arrive at the instantly claimed invention.

In fact, *Hörl* expressly teaches away from using radical initiators to start the polymerization reaction disclosed therein because *Hörl* teaches that the grafting should take place at a "sharply defined position of the base polymer ... with preference on the nitrogen atom," in order to provide "a positive influence on the chemical stability of [the peptide and carbamic acid group] bonds" *Hörl* at col. 1, ln. 65 to col. 2, ln. 5. In

contrast, radical initiators are unspecific and do not direct graft polymerization to nitrogen atoms. Thus, one skilled in the art would be acting in direct conflict with the teachings of *Hörl* by using the thermally labile radical initiators disclosed in *Pitt*.

Even assuming, *arguendo*, that one skilled in the art would have combined the teachings of *Hörl* and *Pitt*, the combination provides no reasonable expectation of success in arriving at the invention of currently pending claims. For example, *Hörl* requires the use of carbon tetrachloride in the graft polymerization process. See, e.g., *Hörl* at col. 4, ll. 25-31. In contrast, the present invention would not function for its intended purpose if it used toxic chemicals, such as carbon tetrachloride, because such chemicals would remain in the porous polymeric structures of the resulting adsorption materials, making the materials inappropriate for medical applications. In addition, the process disclosed in *Hörl* directly couples ethylenically unsaturated monomers to nitrogen-containing polymers. In contrast, the currently pending claims require "covalently coupling the amino-functional groups with a thermally labile radical initiator" such that the radical initiator molecules form a link or a bridge between the nitrogen atom of the amino-functional group and the monomer compound.¹ See, e.g., reaction schemes 1-3 on pages 7-11 of the specification. Thus, *Hörl* teaches a different method and produces a different product than the instant invention. Because *Hörl* fails to explain the mechanism behind the process disclosed therein, one skilled in the art could

¹ Although the Examiner contends that "the reducing agent would couple covalently with the amino functional groups due to chemical attraction when exposed in an aqueous or liquid environment ... and utilizing a thermal activation" (Office Action at p. 4), Applicant respectfully submits that the Office has failed to provide "specific factual findings predicated on sound technical and scientific reasoning" to support that conclusion. M.P.E.P. § 2144.03.

not predict whether the method of *Hörl* would function for its intended purpose if carbon tetrachloride was removed and if the initiator was coupled to the nitrogen group of the polymer before starting the polymerization reaction, as required by the instant invention. Therefore, one skilled in the art would not expect success in arriving at the instant invention based on the teachings of *Hörl* as a primary reference. Thus, for at least the reasons discussed above, independent claims 1 and 14 are allowable over *Hörl* in view of *Pitt*. Accordingly, claims 2-13, 15-26, 35, and 39 are also allowable over *Hörl* in view of *Pitt*, due at least to their dependence from either allowable independent claim 1 or 14, and due to their additional recitations of novel subject matter. Applicant respectfully requests that the Examiner withdraw the obviousness rejections under 35 U.S.C. § 103(a) of these claims.

§ 103(a) Rejections of Claims 27-34 and 36-38

Applicant also traverses the rejection of claims 27-30, 32, and 36 based on *Hörl* in view of *Pitt*, and further in view of *Bell*; the rejection of claim 31 based on *Hörl* in view of *Pitt* and *Bell*, and further in view of *Duggins*; and the rejection of claims 33, 34, 37, and 38 based on *Hörl* in view of *Pitt* and *Bell*, and further in view of *Steuck*. None of the additional secondary references cited by the Examiner (*Bell*, *Duggins*, and *Steuck*) cures the deficiencies of the proposed combination of *Hörl* and *Pitt*, since none of the references provides any reason to predict that the method disclosed in *Hörl* would function for its intended purpose if: (1) a thermally labile radical initiator was substituted for the oxidizing agents disclosed in *Hörl*; (2) carbon tetrachloride was eliminated; and (3) the initiator was coupled to the nitrogen group of the polymer before starting the polymerization reaction, as required by the instant invention, and as discussed above

with respect to independent claims 1 and 14. Moreover, because *Hörl* fails to explain the mechanism behind the process disclosed therein, one skilled in the art could not have predicted which steps may be modified and, therefore, would not be inclined to deviate from the teachings of *Hörl* based on the secondary references. Indeed, if negative results might occur from a particular combination of prior art elements, the invention is not predictable. See *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d. 1350, 1359 (Fed. Cir. 2007). Thus, the demonstrated operability of the invention, despite the skepticism of those skilled in the art, establishes the nonobviousness of the instantly claimed invention.

For at least these reasons, Applicant submits that claims 27-34 and 36-38 are allowable over the cited references at least due to their dependence from either allowable independent claim 1 or 14, and due to their additional recitations of novel subject matter. Thus, Applicant respectfully requests that the Examiner withdraw the obviousness rejections under 35 U.S.C. § 103(a) of these claims.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

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